
The Best Practice Guide to UK Plum Production

Plum Pox Virus

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Background

Plum pox virus (PPV), is the causal agent of Sharka (plum pox) disease, is **the most destructive and damaging pathogen of stone fruit worldwide** (1). PPV can reduce yields by up to 30%, with the total yield loss and damage being estimated at €10 billion over 30 years (2; 3; 4). PPV was first discovered in Bulgaria around 1917 (5), with the first incidence in the UK being identified by researchers at East Malling in 1965 (6). It has since spread into other fruit-growing areas of the UK, with rootstock beds in propagation nurseries were found to exhibit particularly high rates of infection of PPV (7). PPV has been classified as a statutory pathogen in the UK since 1975, which entailed the implementation of a stricter certification scheme, regular testing of mother stocks and frequent inspections of nurseries.

Symptoms

PPV symptoms can occur in leaves, fruits, petals, bark, shoots and even stones (1). Some symptoms of PPV may be mistaken for nutrient deficiencies or pesticide damage, as they appear as pale green/yellow **chlorotic spots, mottling and distortions** on the leaves due to PPV-induced changes in chlorophyll concentration. These changes in chlorophyll result in **reduced sugar** content and **increased fruit acidity**. The disease causes **fruit to drop early, deform** or display **chlorotic spots and necrosis** (2). These symptoms are less visible during periods of prolonged hot weather, and they may not appear until several years after infection (1). PPV rarely leads to tree mortality; however, it may cause reductions in crop yield and tree longevity (8).



Figure 1 Plum pox (sharka) symptoms on plum fruits and leaves.

Contributing Factors

Aphids are vectors of PPV, and it is therefore important that their populations are controlled in order to aid the prevention of the spread of this disease and to carry out checks of trees before aphids numbers increase in the summer.

PPV can also spread via **infected rootstocks or budwood**, which highlights the importance of regular testing of nursery stock and planting material.

Control Treatments/Prevention

The main control strategies for PPV have shifted from eradication to containment and preventative measures, which involve **destroying infected trees, controlling suckers** and replanting with **certified virus-free material** (9). The use of plant certified virus-free nursery rootstocks and budwood is crucial since the virus infection occurs more rapidly in younger wood (8).

It is recommended that trees are **inspected at least twice a year** in June and late August/early September for any signs of PPV symptoms (8). Laboratory tests can be used to confirm the presence of the PPV virus either via PCR or ELISA (enzyme-linked immunosorbent assay) developed by (10).

Any trees found to exhibit symptoms should be removed immediately from the orchard and either burned or chipped. The stumps of infected trees should be treated with a registered herbicide, and the root systems and any suckering roots should be removed as much as possible (8). In France, trees must be destroyed within 10 days after being confirmed to have PPV infection, and if a certain threshold for PPV incidence (10% of trees) is exceeded, then the entire orchard must be destroyed at the end of the growing season (11). However, in the UK the only requirement is that cases of PPV infections are contained and orchards are actively surveyed (9). A one-year fallow period is advised before replacing uprooted PPV-infected stone fruit trees.

Controlling migrant aphid populations is an effective strategy to minimise PPV risk in orchards, as they are the main vector of the disease through orchards. Actions which can help mitigate the risk of migrant aphids spreading the disease include restricting the use of insecticides to periods when the economic threshold aphid population level is met and by the removal of suckers which are highly attractive to aphids (8). Insecticides are generally ineffective at preventing the spread of diseases by aphid populations which can acquire and spread the infection in a short time-frame and applying them too early may actually accelerate the spread of the disease as it can affect the behaviour of migrant aphids that arrive in the orchard post-spraying causing them to increase frequency of leaf probing (12). The use of horticultural mineral oils during periods of migrant aphid flights, on the other hand, has been demonstrated to reduce (but not prevent) the spread of PPV in *Prunus* orchards by interfering with the PPV acquisition-transmission process by aphids (13; 14).

Caution

The information contained within this Best Practice Guide is correct to the best of the authors' knowledge at the time of compilation but it must be understood that the biological material/systems and the regulatory framework referred to within these guides are subject to change over time. Anyone looking to make use of the information should check it against prevailing local conditions.

All pesticide recommendations and approvals are subject to change over time and the user of this Guide is reminded that it is his/her responsibility to ensure that any chemical intended for use by them is approved for use at the time of the intended application. The user is reminded that they must carefully read and follow the label on each chemical before applying any treatments.

References

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